This Inſtrument becomes a Micrometer on the ſame Principles, tho' I was obliged to alter its Structure from that uſed with the Teleſcope, which was firſt invented by Mr. *Gaſcoign*, improved by Mr. *Townly*, and deſcribed by Dr. *Hook*, as appears by *Numb.* 25. and 29. of Mr. *Oldenburg*'s *Philoſophical Tranſactions*; to which Deſcription, if I did not acknowledge my ſelf beholden, were to do great Injuſtice to the Authors of that excellent Invention.

The Thermometer is capable of the like Improvement, but then the Screw of the Micrometer muſt be much longer, and the Microſcope will require a longer Tube, to the End the Body of the Obſerver be not too near the Thermometer, and by its warm Effluvia deceive his Judgment in the Air's Temperature.

Canterbury, May 2.
1698.

IV. *Part of a Letter from Dr.* William Muſgrave, *Fellow of the College of Phyſicians, and R. S. to Dr.* Sloane, *concerning the Cauſe of the Neceſſity of Breathing.*

YOU know, how difficult it has been thought, to account for the principal Uſe of Reſpiration: Nothing is more evident, than that breathing is, from the very Moment of our Birth, perpetually neceſſary to Life; yet nothing more in the Dark, than the true Cauſe and Reaſon of that Neceſſity.

Dr. *Thruſton* aſſerts the chief Uſe of Reſpiration, to conſiſt, in maintaining a due Motion of the Blood.

Officium

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Officium illud [*Reſpirationis præcipuum*] *Nos in eo maximè poſitum arbitramur, quòd Sanguinis Motui inſerviat, eumq; tueatur.* pag. 6. Edit. *Lond.* 1670.

And, to make out his Aſſertion, he urges (among other Arguments of leſs note) That this Opinion, eaſily explains, the Manner of Sudden Death, by Strangling; by drowning; and by violent Catarrhs; ſuppoſing Death, and the Stagnation of the Blood in the Lungs, Right Ventricle of the Heart, *&c.* to ariſe, in all theſe Caſes, from the Stoppage of the Breath.

Etmuller embraces the ſame Opinion; and, in Defence of it, alledges the ſame Argument: Indeed they both depend on it, as highly probable and convincing.

Tho', I think, the Opinion is very Rational; I cannot ſay it appears ſuch, from the Argument now produc'd; which, upon Examination, will be found too liable and obnoxious to bear ſo great a Proportion of the Proof.

By Dr. *Thruſton*'s own Conceſſion, (*pag.* 173.) Men that are Hang'd, may, with good Reaſon, be ſuppoſed to die, partly, from the mutual Commerce between the Head and Heart, being now intercepted. The remarkable Lividneſs of their Faces, with the extraordinary Diſtention of the Jugulars, in their ſeveral Branches above the Ligature, argue, they die, in a great Meaſure, *Apoplectical.*

Now, whatever ſhare the Interruption of this mutual Commerce has, in killing the Man; ſo much the leſs Reaſon have we to impute his Death, and the Stagnation of Blood in his Lungs, *&c.* to the Stoppage of his Breath.

Nor is the Second Caſe (that of Sudden Death by Drowning) without Exception: For here, the Water ruſhing, after an unuſual Manner, into the Lungs, may

be ſuſpected ſo to affect them, as to occaſion Death, tho' not by ſtopping the Circulation.

And, as to Suffocation from a Catarrh, inſtances of this Kind, with Anatomical Obſervations on them, have not (to me at leaſt) occur'd, ſufficient to prove, what was intended by this Argument.

Wherefore, that a Noble Propoſition may not want Evidence, and that the Opinion, my Learned Countryman has ſo ingeniouſly defended, may for ever obtain, I pitcht on the following Experiment as Luciferous, and, I hope it will appear deciſive of the Matter.

I took a large, middle-aged, healthy Dog; and, having freed the *Trachea* from the adjacent Parts, cut it off juſt beneath the *Pomum Adami*, and turn'd the looſe End outward. After ſome time allowed him to recover the preſent Concern; with a Cork, got ready on purpoſe, I ſtopt up the *Trachéa*, binding it cloſe to the Stopple. Some few, but violent Struggles ſucceeded; in which the Sternum was raiſed, as in the deepeſt Inſpiration; and thus he died. From the Stoppage of his Breath, to the laſt Motion I could diſcern in any Part of his Body, was, from a Watch, obſerved to be the Space of Two Minutes. I then immediately threw open the *Thorax*; where I ſaw the Blood Stagnating in the Lungs; the *Arteria Pulmonaris*, the Right Ventricle of the Heart, with its appending Auricle, and the Two great Trunks of the *Cava*, diſtended with Blood, to a Degree exceſſive: The *Vena Pulmonaris*, Left Auricle and Ventricle of the Heart, in a Manner Empty; not containing (as near as I can gueſs) more than One Spoonful of Blood.

This Experiment proves, That the Reſpiration promotes the Paſſage of the Blood thro' the Lungs; and that in Bodies full of vigorous Blood, it is, on this Account of perpetual Neceſſity.

This

This Acceleration of the Blood in that Paſſage, ſeems to be the principal uſe of Reſpiration; no other is of ſuch Conſequence to Life, or ſtands in Competition with it.

Exon, May 9.
1698.

V. *An Account of what happened on Syringing warm Water into the Thorax of a Bitch. By Dr.* William Muſgrave, *Fellow of the College of Phyſicians, and R. S.*

ON *Thurſday*, the 21ſt of *June*, 1683. I ſyringed ℥iv. of warm Water into the Right Side of a Greyhound Bitch; which cauſed a great Rigour (eſpecially in the Hinder Parts) a Shortneſs of Breath; a Heat, or burning in the Fleſh; ſhe looked heavy, was unwilling to riſe or ſtand long on her Feet; thoſe Symptoms wore off by Degrees, ſo that in a Weeks time ſhe appeared as well as ever.

On the 2d of *July* following (that is Eleven Days after the former Experiment) I injected ℥xvj. of warm Water into the Left Side of the Thorax of the ſame Greyhound, after which ſhe was extreamly hot, and ſhort Breath'd, I felt a violent throbbing in her Heart, but the Rigour was not ſo great as in the firſt Experiment; ſhe recovered this alſo in the Space of a Week.

About the 15th *ditto*, I injected ℔ij ſ. of Warm Water into one Side of the Thorax, and ℔ſ. into the other Side of the ſame Bitch; the Symptoms attending it were (as in the former Experiments) a burning in the Fleſh, and